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Part X

Environmental Protection Agency

Petroleum Liquid Storage Vessels; Standards of Performance for New Stationary Sources

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1370-5]

Standards of Performance for New Stationary Sources; Petroleum Liquid Storage Vessels

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This regulation establishes equipment standards which limit emissions of volatile organic compounds (VOC) from new, modified or reconstructed petroleum liquid storage vessels. The standards implement the Clean Air Act and are based on the Administrator's determination that emissions from petroleum liquid storage vessels contribute significantly to air pollution. The intended effect of this regulation is to require new, modified or reconstructed petroleum liquid storage vessels to use the best demonstrated system of continuous emission reduction considering costs and nonair quality health, environmental and energy impacts.

EFFECTIVE DATE: April 4, 1980.

ADDRESSES: Docket No. OAQPS-78-2, containing all supporting information used by EPA in developing the standards, is available for public inspection and copying between 8 a.m. and 4 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2903B, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Don R. Goodwin, Director, Emission Standards and Engineering Divison (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone no. (919) 541-5271.

SUPPLEMENTARY INFORMATION:

The Standards

The standards promulgated under Subpart Ka require each new, modified or reconstructed petroleum liquid storage vessel of greater than 151,416 liters (40,000 gallons) capacity containing a petroleum liquid with a true vapor pressure greater than 10.3 kPa (1.5 psia) to be equipped with one of the following:

1. An external floating roof fitted with a double seal system between the tank wall and the floating roof;
2. A fixed roof with an internal-floating cover equipped with a seal between the tank wall and the edge of the cover;
3. A vapor recovery and disposal or return system which reduces VOC emissions by at least 95 percent, by weight; or
4. Any system which is demonstrated to the Administrator to be equivalent to those described above.

Each affected vessel storing a petroleum liquid with a true vapor pressure greater than 76.6 kPa (11.1 psia) must be equipped with a vapor recovery and disposal or return system, or equivalent. Storage vessels of less than 1,589,800 liters (420,000 gallons) capacity used for petroleum or condensate stored prior to custody transfer are exempt from the standards.

Many of the petroleum liquid storage vessels covered by the standards are likely to be in locations other than petroleum refineries. If the storage vessel contains petroleum or condensate, or finished or intermediate products manufactured at a petroleum refinery, and the size and true vapor pressure applicability criteria are met, the vessel would be covered by the standards regardless of its location. For example, cyclohexane may be produced at a petroleum refinery and then stored at a chemical plant before being used in the plant. The storage vessel at the chemical plant would be covered by the standards if its size and the true vapor pressure of the cyclohexane are greater than the cut-offs in the standards.

The regulation contains allowable seal gap criteria based on gap surface area per unit of storage vessel diameter. The standards require owners or operators to measure and report seal gaps annually for the secondary seal and every five years for the primary seal for each affected storage vessel. The standards also require owners or operators to monitor and maintain records of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of the petroleum liquid during its storage period for each affected storage vessel.

Several definitions and the monitoring and record keeping requirements of Subpart K have been revised to make them consistent with those in Subpart Ka. These revisions to Subpart K clarify the regulation and make it less burdensome for owners and operators but do not affect the emission reductions required by Subpart K.

The promulgated standards are in terms of equipment specifications and maintenance requirements rather than mass emission rates. It is extremely difficult to quantify mass emission rates for petroleum liquid storage vessels because of the varying loss mechanisms and the number of variables affecting loss rate. Section 111(h)(1) of the Act provides that equipment standards may be established for a source category if it is not feasible to prescribe or enforce a standard which specifies an emission limitation.

Environmental and Economic Impact

Compliance with these standards will reduce VOC emissions to the atmosphere from petroleum liquid storage vessels with external floating roofs by about 75 percent. This estimate is based on a comparison of VOC emissions between storage vessels equipped with external floating roofs and single seals and storage vessels equipped with any of the systems required in the standards. The standards will reduce VOC emissions by about 4,545 megagrams per year (5000 tons per year) by 1985.

This emission reduction will be realized without adverse impacts on other aspects of environmental quality, such as solid waste disposal, water pollution, or noise. There will be no adverse energy impacts associated with the standards. In fact, energy savings will result because the standards will help prevent the loss of valuable petroleum products. The economic impact of the standards is considered reasonable. The cost of complying with the standards will be only the incremental cost of installing a secondary seal. This will increase the cost of a new 61-meter diameter storage vessel by about 0.6 to 1.3 percent. The incremental capital costs will be about $12,000 to $19,000, and the average incremental annualized costs will vary between $1,100 and $3,300 per storage vessel depending on the true vapor pressure of the petroleum liquid, the average wind velocity, and the cost of the petroleum liquid.

Public Participation

The Standards were proposed in the **Federal Register** on May 18, 1978 (43 FR 21615). To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standards, a public hearing was held on June 7, 1978, in Washington, D.C. In addition, during the public comment period from May 18, 1978, to July 19, 1978, a total of 35 comment letters was received. These comments have been carefully considered and, where determined to be appropriate, changes have been made in the final regulation.

Significant Comments and Changes Made

Comments were received from industry representatives, utility companies, and State and Federal agencies. Most of the comment letters contained multiple comments. The comments have been divided into the following areas for discussion: testing and monitoring, technology, impacts, and general.

Testing and Monitoring

Most of the comments concerned the proposed requirements for inspecting the seals on external floating roof storage vessels. The proposed standards required that inspection of the seals be performed while the roof was floating. They also required, however, that the secondary seal be kept in place at all times if the storage vessel contained a petroleum liquid with true vapor pressure greater than 10.3 kPa (1.5 psia). This meant that if the secondary seal would have to be dislodged or removed to inspect the primary seal, the vessel would have to be empted of petroleum liquid and the roof raised with some other liquid. The preamble suggested using water to do this. Commenters pointed out that the use of a liquid other than a petroleum liquid would put the storage vessel out of service for an indefinite period, that water was unavailable in many areas, and that water, if used, would become contaminated with petroleum liquids which would have to be separated prior to discharge.

EPA has determined that these comments are valid and that the VOC emissions occurring during the relatively short inspection period would be insignificant when compared to the impact of using water as the test fluid. Therefore, the final regulation allows the removal of the secondary seal for the inspection of the primary seal while the storage vessel is in operation. Higher emissions will, however, result from the removal of the secondary seal. To reduce this period of increased emissions, the final standards require inspection of the primary seal to be performed as rapidly as possible and the secondary seal replaced as soon as possible.

Many commenters stated that seal gap measurement at one level would provide sufficient indication of seal integrity and that the proposed requirement for measuring at eight levels would be too burdensome, expensive, and would provide little, if any, additional information. Most of these commenters recommended measuring seal gaps at the "as found" level. It is not clear whether the benefits of the eight-level gap measurement would outweigh the adverse impacts. In addition, since the final standards allow removal of the secondary seal during measurement and inspection of the primary seal, it is important to minimize the amount of time the secondary seal is not in place. Reducing the number of required measurement levels thus will help to minimize the VOC emissions during primary seal gap measurements. Therefore, the final regulation requires that seal gaps be measured at one level with the stipulation that the roof be floating off the roof leg supports. The owner or operator is required to notify EPA prior to gap measurement and provide all of the results of such measurements to EPA each time they are performed.

The proposed seal gap measurement frequency of five years was criticized by many commenters. Some claimed this to be too frequent while two commenters suggested performing gap measurements during scheduled storage vessel maintenance periods. Requiring seal gap measurements only during scheduled maintenance would not provide uniform impacts on owners and operators. Those with more frequent maintenance periods would be required to measure seal gaps more often than those with less frequent maintenance periods. Therefore the same measurement frequency is required of all owners and operators regardless of their maintenance schedules. The promulgated standards require a different frequency, however, for the primary seal than for the secondary seal. Data derived from tests conducted by Chicago Bridge and Iron Company (CBI) on a 20-foot diameter test storage vessel clearly indicate that secondary seal gaps increase VOC emissions to a greater degree than gaps in the primary seal. Because of its greater sensitivity, a more frequent inspection of the secondary seal is considered necessary. Consequently, the final regulation requires the secondary seal gaps to be measured at initial fill and at least once annually and the primary seal gaps at initial fill and at least once every five years. The requirement for more frequent gap measurements for secondary seals is not expected to increase the impact of the final standards in comparison to the proposed standards. In fact, the impact will be less because gap measurements are required at only one roof level instead of the proposed eight levels, and they may be conducted without taking the storage vessel out of service. If a storage vessel is out of service (i.e., empty) for more than one year, gap measurements must be conducted upon refilling. This is considered necessary to ensure that the seal system integrity has not severely deteriorated during the period of inactivity. The final regulation therefore, defines such refilling as "initial fill" and the required frequency of gap measurements would be based upon the date of refilling.

One commenter suggested requiring visual seal inspections instead of seal gap measurements. This approach was considered but rejected because of the inability to develop a visual inspection procedure which could be applied uniformly. The subjectiveness of such a procedure would preclude the use of the data that would be obtained.

The gap criteria by size classes specified in the proposed regulation were unfair, claimed two commenters, and are not consistent with the CBI data. As pointed out by one commenter, a three-sixteenths inch gap around the entire storage vessel would produce less gap surface area than the proposed standards allowed yet would be out of compliance with the proposed gap criteria. To eliminate this possibility, the final regulation specifies total gap surface area criteria specific to the storage vessel diameter for the primary and the secondary seal. Since the seal gap surface area allowed in the final standards is approximately equal to that allowed in the proposed standards, about the same VOC emission reduction and cost of performing gap measurements will result. The final standards, however, will provide a more effective and uniform procedure for ensuring that seals are properly installed and maintained.

Two commenters questioned the apparently inflexible requirement in the proposal that only pre-sized probes were to be used for gap measurements. As pointed out by one commenter, use of an L-shaped probe, in some cases, could eliminate the need to remove the secondary seal when measuring gaps in the primary seal. The secondary seal, in many cases, could merely be pulled back and the L-shaped probe inserted for accurate gap determinations. Such an approach may be reasonable, and there may be other suitable methods for measuring gaps. Therefore, the regulation specifies one method of gap measurement but includes provisions for allowing other methods provided they can be demonstrated to be equivalent.

According to four commenters, the monitoring requirements specified in the proposed rule were too burdensome and were probably of little value. They also pointed out problems with Reid vapor pressure conversions and true vapor pressure determinations in some cases.

EPA agreed with this comment and has re-evaluated the amount of monitoring information needed to be able to ensure that owners or operators of storage vessels covered by the regulation are complying with the standards. As a result, the final regulation has been revised to require that a record be kept of the maximum true vapor pressure and the periods of storage of each vessel's contents. This maximum true vapor pressure can be determined from available data on the typical Reid vapor pressure and the maximum expected storage temperature. This precludes the proposed requirement that an average temperature record be kept. For any crude oil with a true vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended methods, the true vapor pressure is to be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia). The final regulation allows two exemptions from the monitoring requirements: (1) If the petroleum liquid has a Reid vapor pressure less than 6.9 kPa (1.0 psia) and the true vapor pressure will never exceed 6.9 kPa (1.0 psia) or (2) if the storage vessel is equipped with a vapor return or disposal system in accordance with the requirements of the standard. This revision relieves much of the record keeping and monitoring burden of the proposed regulation but is not expected to impact the amount of VOC emissions.

Two letters commented on the requirement in the proposed standard that there be four access points through the secondary seal to the primary seal to allow inspection while the storage vessel is in operation. One commenter said it was unnecessary while the other commenter stated that the access points should be chosen at random by the inspector. Since the regulation has been revised to allow removal of the secondary seal for primary seal inspections and gap measurements while the vessel is in operation, requiring the owner or operator to provide four access points to the primary seal is not necessary. Therefore, this requirement has been deleted.

Technology

Seven commenters questioned the validity of scaling up the CBI test vessel data by linear extrapolation to field size storage vessels as was done to calculate actual emission reductions. Many of these commenters also believed that the static test conditions were not representative of dynamic field conditions. These commenters recommended awaiting results of the American Petroleum Institute (API) study of VOC emissions from petroleum liquid storage vessels in actual field conditions. Preliminary results of the API study have been released, however, and indicate that VOC emissions from field storage vessels are directly proportional to vessel diameter. Therefore, the VOC emission estimates based on CBI data are considered valid.

Four commenters stated that storage vessels could not meet seal gap specifications even if they met current plumbness and roundness specifications contained in API Standard 650 which is used for construction standards for new storage vessels. The out-of-plumbness specification in API Standard 650 allows ½ percent of the height of the vessel and the roundness specification is grouped by vessel diameter as follows:

Storage Vessel Diameter and Radius Tolerance

	Inches
0 to 40 feet exclusive	±½
40 to 150 feet exclusive	±¾
150 to 250 feet exclusive	±1
250 feet and over	±1¼

Some of these commenters felt that the construction tolerances would have to be reduced considerably for primary and secondary seals to maintain compliance with the gap criteria at all roof levels, thereby effecting a significant economic impact of increased construction costs which EPA failed to consider. However, a compilation by EPA of the California Air Resources Board (CARB) petroleum liquid storage vessel inspection reports showed that a majority of existing welded vessels inspected in California would have been in compliance with the seal gap criteria in both the proposed and final regulations had these regulations been in effect. Since the majority of those tanks were found to be in compliance with the seal gap standards, it is EPA's judgement that all new petroleum liquid storage vessel seals could meet the gap standards. Therefore, EPA believes the standards are attainable under present construction standards.

In the proposed regulation, the requirement that a vapor recovery and return or disposal system be capable of collecting and preventing the release of all VOC vapors implied 100 percent control efficiency, and four commenters stated that this was impossible to achieve. EPA did not intend to necessarily require 100 percent control but rather to require that the system be properly designed, installed, and operated. There are two parts to a vapor recovery and return or disposal system. The vapor recovery portion collects the VOC vapors and gases from the storage vessel and vents them to a control device which then processes them by either recovering them as product or disposing of them. A properly designed collection system would be capable of collecting all the VOC vapors and gases except when pressure relief vents on the storage vessel roof would open and release VOC emissions to the atmosphere. The only time these vents would open is during periods when the emission control system is not operating properly and VOC vapors are not being vented to the control device, causing a pressure buildup in the storage vessel. Such an occurrence would be considered a malfunction if it could not be avoided through proper operation and maintenance and, therefore, would not cause the storage vessel to be out of compliance with the standard. Therefore, EPA considers the requirement that the system "collect all the vapors and gases discharged from the storage vessel" to be achievable and reasonable and has retained it in the final regulation. EPA agrees with the commenters that the second part of the system, the return or disposal portion, is not likely to be able to achieve 100 percent control efficiency. It is generally acknowledged, however, that greater than 95 percent VOC emission reduction can be achieved by at least two commonly used types of vapor control devices, thermal oxidation and carbon adsorption. Therefore, the final regulation requires that any vapor recovery and return or disposal system used to comply with the standard must collect all the VOC vapors and gases discharged from the storage vessel and be capable of processing them so as to reduce their emission to the atmosphere by at least 95 percent by weight.

To enable EPA to determine compliance with the requirements for vapor recovery and return or disposal systems, the regulation requires the owner or operator to submit plans and specifications for the system to EPA on or before the date on which construction of the storage vessel is commenced. Owners and operators are encouraged to provide this information as far in advance as possible of commencing construction.

One commenter suggested that the section on "Equivalent Equipment" be expanded to include the use of innovative vapor control equipment other than the three types specified in the proposed standards. To encourage innovation, an equivalency clause is provided in the final regulation that applies to all parts of the standards provided no decrease in emission

reduction will result and can be so demonstrated. Determinations of equivalency for VOC emission reduction systems not specifically mentioned in the regulation will generally be made by comparing the VOC emissions from such a source to the VOC emissions calculated for an external floating roof welded storage vessel with secondary and primary seals according to equations in API Bulletin 2517, "Evaporation Loss from External Floating Roof Tanks," February 1980. There will probably be cases in which determinations of equivalency cannot be made through a strict comparison of emission reduction, and these will be based on sound engineering judgment. Therefore, the regulation requires that any request for an equivalency determination be accompanied by VOC emission reduction data, if available, and also by detailed equipment and procedural specifications which would enable a sound engineering judgment to be made. In accordance with section 111(h)(3) of the Clean Air Act, any equivalency determination shall be preceded by a notice in the **Federal Register** and an opportunity for a public hearing.

Non-metallic, resilient primary seals were considered by four commenters to be equivalent to metallic shoe seals. A reevaluation of available data, some of which were received after issuance of the proposed regulation, indicates that various types of seals may provide essentially the same degree of emission reduction. The final regulation, therefore, allows use of liquid-mounted, foam-filled seals; liquid-mounted, liquid-filled seals; or vapor-mounted, foam-filled seals in addition to metallic shoe seals as primary seals on external floating roofs. Vapor-mounted seals, however, are equivalent to the others only when the gap area of vapor-mounted seals is significantly less than the gap area of the others. Therefore, the final regulation requires more stringent gap criteria for vapor-mounted primary seals.

Several commenters recommended exemption from the standards for storage vessels involved in oil field and production operations. Such vessels are generally small, bolted, and equipped with fixed roofs. This is to enable them to be dismantled, transported and reerected as needed. Therefore, to comply with the standards, a new production field vessel would have to be equipped with either an internal floating roof or a vapor recovery system. Commenters provided information which indicated that vapor recovery would be very difficult and expensive due to the remote location of many vessels. One commenter also submitted data to show that internal floating roofs would generally not be cost-effective for production vessels with capacities less than 1,589,873 liters (420,000 gallons). Therefore, the final regulation exempts each storage vessel with a capacity of less than 1,589,873 liters (420,000 gallons) used for petroleum or condensate stored, processed, or treated prior to custody transfer. This exemption applies to storage between the time that the petroleum liquid is removed from the ground and the time that custody of the petroleum liquid is transferred from the well or producing operations to the transportation operations. If it is determined in the future that VOC emissions from new production field vessels smaller than 1,589,873 liters (420,000 gallons) are significant, separate standards of performance will be developed.

One commenter indicated that internal non-contact floating roofs do not reduce emissions to the same degree as contact floating roofs and points out that API Standard 650 recommends the use of the contact type. EPA is concerned about the difference in emission control of these two types of floating roofs although insufficient data exist at present to justify a revision to the standards for petroleum liquid storage vessels. One type of non-contact floating roof was tested at CBI and the results were forwarded to EPA in late 1978. The results indicate that the roof did not reduce emissions to the same degree as a contact roof. However, slight auxiliary equipment differences such as different seals used with the different roofs prohibit development of valid conclusions. Therefore, more information is necessary to determine if the petroleum liquid storage vessels standard should be revised. Consequently, EPA is considering a study specifically to determine differences in VOC emission control of these two types of internal floating roofs.

Impacts

The proposed regulation specified that the roof must be floating on the liquid at all times except when the storage vessel is completely emptied, during initial fill, or performance tests. Three commenters stated that the level of the liquid should be allowed to go below the level where the roof comes to rest on the roof leg supports even if the vessel is not completely emptied. This would avoid the loss of working capacity and, thus, the need for more storage vessels. A significant amount of VOC emissions, however, would result upon refilling. The intent of the regulation is to avoid having a vapor space between the roof and the petroleum liquid surface for extended periods. The quantity of petroleum liquid remaining in the bottom of a storage vessel with the floating roof on its leg supports and the time it remains in this condition determines the amount of VOC saturation of the vapor space and the subsequent emissions upon refilling the storage vessel. It is therefore considered beneficial to the environment for the roof to be kept floating at all times except when the tank is initially filled or completely emptied and refilled for such purposes as routine tank maintenance, inspections, petroleum liquid deliveries, or transfer operations. Therefore, the final regulation requires that the roof be floating on the liquid at all times except during initial fill and when the vessel is completely emptied and refilled. To minimize the amount of time the petroleum liquid remains in the storage vessel while the roof is resting on the roof leg supports, the final regulation also requires that the process of emptying and refilling be performed as rapidly as possible.

As mentioned before, the proposed regulation did not require the roof to be floating on the petroleum liquid during performance tests. This exemption was needed since the proposal required that gap measurements be conducted with a liquid other than a petroleum liquid in the storage vessel (the preamble suggested using water). Therefore, the storage vessel would have had to be emptied and the roof re-floated on the non-petroleum liquid. Since the final regulation allows gap measurements to be conducted while the vessel contains petroleum liquid, this exemption has been removed.

General

It was pointed out by two commenters that because the proposed regulation stated that a secondary seal gap would exist only if the probe touched the primary seal, gaps in the same location in the primary seal and the secondary seal would not be allowed. The proposed regulation stated that "a gap is deemed to exist under the following conditions: * * * for a secondary seal, the probe is to touch the primary seal without forcing." This erroneously implied that a secondary seal gap would not exist should the probe be able to pass between the secondary and primary seals and the tank wall and touch the liquid surface. These commenters concluded that EPA intended to regulate not only the size and area of seal gaps but also their locations in each seal. This was not the

intent of the proposed regulation. The final regulation eliminates this ambiguity and redefines "gaps" as those places where a uniform one-eighth inch diameter probe passes freely between the seal and the tank wall.

Two commenters stated that a person walking on an external floating roof could alter gap configuration and would pose a safety hazard because the roof could possibly sink. Three commenters felt that a fire hazard would be created by the vapor that would become trapped between the primary and secondary seals. These comments were expressed as opinions without any supporting data or information. Since no such incidents have been reported to EPA, and since external floating roofs with double seals are commonly used and apparently operating safely even during inspections, it is EPA's judgement that the standards will not create either of these hazards. A person walking on an external floating roof should not cause significant gap alterations since these roofs are designed and built for this purpose. Any small gap alteration should not affect compliance status of seal gaps since the allowable gap criteria are based on total surface area of all gaps.

The term "hydrocarbon" has been changed to "volatile organic compounds (VOC)" in the final regulation. This change in terminology is consistent with current EPA policy concerning compounds which react photochemically in the atmosphere to form ozone. Reference has been made in the past to "organic solvents," "thinners," and "hydrocarbons," in addition to "VOC" to represent these compounds. Some organics which are ozone precursors are not hydrocarbons in the strictest definition and are not always used as solvents. Therefore, all reference to emissions and emission reduction in the standards refer to the organic compounds which are ozone precursors and have been designated VOC.

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by the Administrator in the development of this rulemaking. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process. Along with the statement of basis and purpose of the promulgated rule and EPA responses to significant comments, the contents of the docket will serve as the record in case of judicial review.

Miscellaneous

The effective date of this regulation is April 4, 1980. Section 111 of the Clean Air Act provides that standards of performance become effective upon promulgation and apply to affected facilities, construction or modification of which was commenced after the date of proposal (May 18, 1978).

EPA will review this regulation four years from the date of promulgation. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology.

It should be noted that standards of performance for new stationary sources established under section 111 of the Clean Air Act reflect:

> * * * Application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any non air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated (section 111(a)(1)).

Although there may be emission control technology available that can reduce emissions below those levels required to comply with standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requries (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas, i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, section 173 of the Act requires that a new or modified source constructed in an area which exceeds the National Ambient Air Quality Standard (NAAQS) must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in section 171(3), for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) The most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or
>
> (B) The most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard (section 171(3)).

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in section 169(1)] employ "best available control technology" (BACT) as defined in section 169(3) for all pollutants regulated under the Act. Best available control technology must be determined on a case-by-case basis, taking energy, environmental and economic impacts, and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 (or 112) of the Act.

In all events, State implementation plans (SIP's) approved or promulgated under section 110 of the Act must provide for the attainment and maintenance of National Ambient Air Quality Standards designed to protect public health and welfare. For this purpose, SIP's must in some cases require greater emission reductions than those required by standards of performance for new sources.

Finally, States are free under section 116 of the Act to establish even more stringent emission limits than those established under section 111 or those necessary to attain or maintain the NAAQS under section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than EPA's standards of performance under section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for revisions of standards of performance which the Administrator determines to be substantial. An economic impact assessment has been prepared and is included in the docket. All the information in the economic impact assessment was considered in determining the cost of these standards.

Dated: March 28, 1980.

Douglas M. Costle,

Administrator.

40 CFR Part 60 is amended by revising § 60.11(a); the heading of Subpart K; § 60.110(c)(1) and (c)(2); § 60.111(b) and (c); the heading of § 60.112; § 60.113; and by adding a new Subpart Ka as follows:

1. Paragraph (a) of § 60.11 is revised to read as follows:

§ 60.11 Compliance with standards and maintenance requirements.

(a) Compliance with standards in this part, other than opacity standards, shall be determined only by performance tests established by § 60.8, unless otherwise specified in the applicable standard.

* * * * *

2. The heading for subpart K is revised to read as follows:

Subpart K—Standards of Performance for Storage Vessels for Petroleum Liquids Constructed After June 11, 1973 and Prior to May 19, 1978

3. Paragraphs (c)(1) and (c)(2) of § 60.110 of Subpart K are revised to read as follows:

§ 60.110 Applicability and designation of affected facility.

* * * * *

(c) * * *

(1) Has a capacity greater than 151,416 liters (40,000 gallons), but not exceeding 246,052 liters (65,000 gallons), and commences construction or modification after March 8, 1974, and prior to May 19, 1978.

(2) Has a capacity greater than 246,052 liters (65,000 gallons) and commences construction or modification after June 11, 1973, and prior to May 19, 1978.

* * * * *

4. Paragraphs (b) and (c) of § 60.111 of Subpart K are revised to read as follows:

§ 60.111 Definitions.

* * * * *

(b) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in ASTM–D–396–78, gas turbine fuel oils Nos. 2–GT through 4–GT as specified in ASTM–D–2880–78, or diesel fuel oils Nos. 2–D and 4–D as specified in ASTM–D–97578.

(c) "Petroleum refinery" means each facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting, or reforming of unfinished petroleum derivatives.

* * * * *

5. The heading of § 60.112 of Subpart K is revised to read as follows:

§ 60.112 Standard for volatile organic compounds (VOC).

* * * * *

6. Section 60.113 of Subpart K is revised to read as follows:

§ 60.113 Monitoring of operations.

(a) Except as provided in paragraph (d) of this section, the owner or operator subject to this subpart shall maintain a record of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of that liquid during the respective storage period.

(b) Available data on the typical Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517, unless the Administrator specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the sample(s).

(c) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method is to be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia).

(d) The following are exempt from the requirements of this section:

(1) Each owner or operator of each affected facility which stores petroleum liquids with a Reid vapor pressure of less than 6.9 kPa (1.0 psia) provided the maximum true vapor pressure does not exceed 6.9 kPa (1.0 psia).

(2) Each owner or operator of each affected facility equipped with a vapor recovery and return or disposal system in accordance with the requirements of § 60.112.

7. A new Subpart Ka is added to read as follows:

Subpart Ka—Standards of Performance for Storage vessels for Petroleum Liquids Constructed After May 18, 1978

Sec.

60.110a Applicability and designation of affected facility.
60.111a Definitions.
60.112a Standard for volatile organic compounds (VOC).
60.113a Testing and procedures.
60.114a Equivalent equipment and procedures.
60.115a Monitoring of operations.

Authority: Sec. 111, 301(a) of the Clean Air Act as amended (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart Ka—Standards of Performance for Storage Vessels for Petroleum Liquids Constructed After May 18, 1978

§ 60.110a Applicability and designation of affected facility.

(a) Except as provided in paragraph (b) of this section, the affected facility to which this subpart applies is each storage vessel for petroleum liquids which has a storage capacity greater than 151,416 liters (40,000 gallons) and for which construction is commenced after May 18, 1978.

(b) Each petroleum liquid storage vessel with a capacity of less than 1,589,873 liters (420,000 gallons) used for petroleum or condensate stored, processed, or treated prior to custody transfer is not an affected facility and, therefore, is exempt from the requirements of this subpart.

§ 60.111a Definitions.

In addition to the terms and their definitions listed in the Act and Subpart A of this part the following definitions apply in this subpart:

(a) "Storage vessel" means each tank, reservoir, or container used for the storage of petroleum liquids, but does not include:

(1) Pressure vessels which are designed to operate in excess of 204.9 kPa (15 psig) without emissions to the atmosphere except under emergency conditions.

(2) Subsurface caverns or porous rock reservoirs, or

(3) Underground tanks if the total volume of petroleum liquids added to and taken from a tank annually does not exceed twice the volume of the tank.

(b) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in ASTM–D–396–78, gas turbine fuel oils Nos. 2–GT through 4–GT as specified in ASTM–D–2880–78, or diesel fuel oils Nos. 2–D and 4–D as specified in ASTM–D–975–78.

(c) "Petroleum refinery" means each facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting, or reforming of unfinished petroleum derivatives.

(d) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(e) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the

temperature or pressure, or both, and remains liquid at standard conditions.

(f) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid such as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, Evaporation Loss from Floating Roof Tanks, 1962.

(g) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by ASTM-D-323–58 (reapproved 1968).

(h) "Liquid-mounted seal" means a foam or liquid-filled primary seal mounted in contact with the liquid between the tank wall and the floating roof continuously around the circumference of the tank.

(i) "Metallic shoe seal" includes but is not limited to a metal sheet held vertically against the tank wall by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

(j) "Vapor-mounted seal" means a foam-filled primary seal mounted continuously around the circumference of the tank so there is an annular vapor space underneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.

(k) "Custody transfer" means the transfer of produced petroleum and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

§ 60.112a Standard for volatile organic compounds (VOC).

(a) The owner or operator of each storage vessel to which this subpart applies which contains a petroleum liquid which, as stored, has a true vapor pressure equal to or greater than 10.3 kPa (1.5 psia) but not greater than 76.6 kPa (11.1 psia) shall equip the storage vessel with one of the following:

(1) An external floating roof, consisting of a pontoon-type or double-deck-type cover that rests on the surface of the liquid contents and is equipped with a closure device between the tank wall and the roof edge. Except as provided in paragraph (a)(1)(ii)(D) of this section, the closure device is to consist of two seals, one above the other. The lower seal is referred to as the primary seal and the upper seal is referred to as the secondary seal. The roof is to be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

(i) The primary seal is to be either a metallic shoe seal, a liquid-mounted seal, or a vapor-mounted seal. Each seal is to meet the following requirements:

(A) The accumulated area of gaps between the tank wall and the metallic shoe seal or the liquid-mounted seal shall not exceed 212 cm^2 per meter of tank diameter (10.0 in^2 per ft of tank diameter) and the width of any portion of any gap shall not exceed 3.81 cm (1½ in).

(B) The accumulated area of gaps between the tank wall and the vapor-mounted seal shall not exceed 21.2 cm^2 per meter of tank diameter (1.0 in^2 per ft of tank diameter) and the width of any portion of any gap shall not exceed 1.27 cm (½ in).

(C) One end of the metallic shoe is to extend into the stored liquid and the other end is to extend a minimum vertical distance of 61 cm (24 in) above the stored liquid surface.

(D) There are to be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

(ii) The secondary seal is to meet the following requirements:

(A) The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in paragraph (a)(1)(ii)(B) of this section.

(B) The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm^2 per meter of tank diameter (1.0 in^2 per ft of tank diameter) and the width of any portion of any gap shall not exceed 1.27 cm (½ in).

(C) There are to be no holes, tears or other openings in the seal or seal fabric.

(D) The owner or operator is exempted from the requirements for secondary seals and the secondary seal gap criteria when performing gap measurements or inspections of the primary seal.

(iii) Each opening in the roof except for automatic bleeder vents and rim space vents is to provide a projection below the liquid surface. Each opening in the roof except for automatic bleeder vents, rim space vents and leg sleeves is to be equipped with a cover, seal or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use or as described in pargraph (a)(1)(iv) of this section. Automatic bleeder vents are to be closed at all times when the roof is floating, except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the roof legs supports or at the manufacturer's recommended setting.

(iv) Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90 percent of the area of the opening.

(2) A fixed roof with an internal floating type cover equipped with a continuous closure device between the tank wall and the cover edge. The cover is to be floating at all times, (i.e., off the leg supports) except during initial fill and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the cover is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible. Each opening in the cover except for automatic bleeder vents and the rim space vents is to provide a projection below the liquid surface. Each opening in the cover except for automatic bleeder vents, rim space vents, stub drains and leg sleeves is to be equipped with a cover, seal, or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the cover is floating except when the cover is being floated off or is being landed on the leg supports. Rim vents are to be set to open only when the cover is being floated off the leg supports or at the manufacturer's recommended setting.

(3) A vapor recovery system which collects all VOC vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such VOC vapors and gases so as to reduce their emission to the atmosphere by at least 95 percent by weight.

(4) A system equivalent to those described in paragraphs (a)(1), (a)(2), or (a)(3) of this section as provided in § 60.114a.

(b) The owner or operator of each storage vessel to which this subpart applies which contains a petroleum liquid which, as stored, has a true vapor pressure greater than 76.6 kPa (11.1 psia), shall equip the storage vessel with a vapor recovery system which collects all VOC vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such VOC vapors and gases so as to reduce their emission to the atmosphere by at least 95 percent by weight.

§ 60.113a Testing and procedures.

(a) Except as provided in § 60.8(b) compliance with the standard prescribed in § 60.112a shall be determined as follows or in accordance with an equivalent procedure as provided in § 60.114a.

(1) The owner or operator of each storage vessel to which this subpart applies which has an external floating roof shall meet the following requirements:

(i) Determine the gap areas and maximum gap widths between the primary seal and the tank wall, and the secondary seal and the tank wall according to the following frequency and furnish the Administrator with a written report of the results within 60 days of performance of gap measurements:

(A) For primary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every five years thereafter. All primary seal inspections or gap measurements which require the removal or dislodging of the secondary seal shall be accomplished as rapidly as possible and the secondary seal shall be replaced as soon as possible.

(B) For secondary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every year thereafter.

(C) If any storage vessel is out of service for a period of one year or more, subsequent refilling with petroleum liquid shall be considered initial fill for the purposes of paragraphs (a)(1)(i)(A) and (a)(1)(i)((B) of this section.

(ii) Determine gap widths in the primary and secondary seals individually by the following procedures:

(A) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

(B) Measure seal gaps around the entire circumference of the tank in each place where a ⅛" diameter uniform probe passes freely (without forcing or binding against seal) between the seal and the tank wall and measure the circumferential distance of each such location.

(C) The total surface area of each gap described in paragraph (a)(1)(ii)(B) of this section shall be determined by using probes of various widths to accurately measure the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.

(iii) Add the gap surface area of each gap location for the primary seal and the secondary seal individually. Divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the appropriate ratio in the standard in § 60.112a(a)(1)(i) and § 60.112a(a)(1)(ii).

(iv) Provide the Administrator 30 days prior notice of the gap measurement to afford the Administrator the opportunity to have an observer present.

(2) The owner or operator of each storage vessel to which this subpart applies which has a vapor recovery and return or disposal system shall provide the following information to the Administrator on or before the date on which construction of the storage vessel commences:

(i) Emission data, if available, for a similar vapor recovery and return or disposal system used on the same type of storage vessel, which can be used to determine the efficiency of the system. A complete description of the emission measurement method used must be included.

(ii) The manufacturer's design specifications and estimated emission reduction capability of the system.

(iii) The operation and maintenance plan for the system.

(iv) Any other information which will be useful to the Administrator in evaluating the effectiveness of the system in reducing VOC emissions.

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

§ 60.114a Equivalent equipment and procedures.

(a) Upon written application from an owner or operator and after notice and opportunity for public hearing, the Administrator may approve the use of equipment or procedures, or both, which have been demonstrated to his satisfaction to be equivalent in terms of reduced VOC emissions to the atmosphere to the degree prescribed for compliance with a specific paragraph(s) of this subpart.

(b) The owner or operator shall provide the following information in the application for determination of equivalency:

(1) Emission data, if available, which can be used to determine the effectiveness of the equipment or procedures in reducing VOC emissions from the storage vessel. A complete description of the emission measurement method used must be included.

(2) The manufacturer's design specifications and estimated emission reduction capability of the equipment.

(3) The operation and maintenance plan for the equipment.

(4) Any other information which will be useful to the Administrator in evaluating the effectiveness of the equipment or procedures in reducing VOC emissions.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.115a Monitoring of operations.

(a) Except as provided in paragraph (d) of this section, the owner or operator subject to this subpart shall maintain a record of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of that liquid during the respective storage period.

(b) Available data on the typical Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517, unless the Administrator specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the sample(s).

(c) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method is to be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia).

(d) The following are exempt from the requirements of this section:

(1) Each owner or operator of each storage vessel storing a petroleum liquid with a Reid vapor pressure of less than 6.9 kPa (1.0 psia) provided the maximum true vapor pressure does not exceed 6.9 kPa (1.0 psia).

(2) Each owner or operator of each storage vessel equipped with a vapor recovery and return or disposal system in accordance with the requirements of §§ 60.112a(a)(3) and 60.112a(b).

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

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